Name: _____

Slope function of sine curve

We will:

- measure the slope, m, of a sine curve at multiple values of x
- make a table of pairs of x and $m(x)$
- plot the slope function: $y = m(x)$
- determine an algebraic function that matches those pairs
- summarize, rephrase, and interpret

Set up Desmos to find slope

1. Open Desmos graphing calculator
2. To draw sine function, enter expression
$$f(x) = \sin(x)$$
3. To draw a point at $x = a$, enter expression
$$(a,\ f(a))$$
and make slider for a.
4. To draw a point at $x = a + h$, enter expression
$$(a + h,\ f(a + h))$$
and make slider for h.
5. To calculate the slope between points, enter expression
$$m = \frac{f(a + h) - f(a)}{h}$$
6. To draw the line through points (using point-slope form), enter expression
$$y = m(x - a) + f(a)$$
7. Tinker with a and h to make sure you understand their significance.

Tinker with h while $a = 1$

8. Set a equal to 1.
9. Vary h between the values 0.1, 0.01, 0.001, and 0.0001 while recording m. Fill out the table below.

a	h	m
1	0.1	
1	0.01	
1	0.001	
1	0.0001	

10. What did you just do, and what did you just find? Use your words (and maybe a sketch) to interpret the above table.

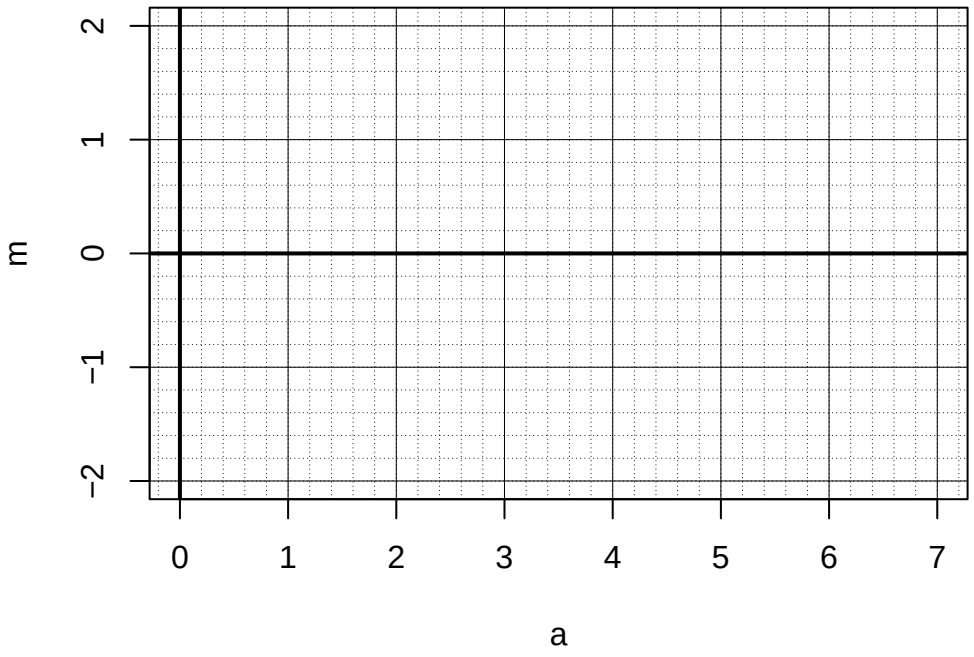
Tinker with a while $h \leq 0.1$

11. Set h equal to 0.1 or smaller. Its exact value should not matter much.
12. Let a vary between 0 and 6.5 with a step size of $\frac{1}{2}$. Record the slopes, rounded to hundredths.

a	m
0	
0.5	
1	
1.5	
2	
2.5	
3	

a	$m(a)$
3.5	
4	
4.5	
5	
5.5	
6	
6.5	

13. Plot those ordered pairs below.



14. Consider the parent functions. Do any of them resemble the plot above?

15. Rephrase. What did you do? What did you learn? How would you explain this?